

§ 7.45 Critical characteristics

The following critical characteristics shall be inspected or tested on each battery assembly to which an approval marking is affixed:

- (a) Thickness of covers and boxes.
- (b) Application and resistance of insulating material.
- (c) Size and location of ventilation openings.
- (d) Method of cell terminations.
- (e) Strain relief devices for cables leaving boxes.
- (f) Type, location, and physical protection of cables.

§ 7.46 Impact test.

(a) *Test procedures.* (1) Prepare four covers for testing by conditioning two covers at -13°F (-25°C) and two covers at 122°F (50°C) for a period of 48 hours.

(2) Mount the covers on a battery box of the same design with which the covers are to be approved, including any support blocks, with the battery cells completely assembled. If used, support blocks must contact only the filler material or partitions between the individual cells. At the test temperature range of 65°F -80°F (18.3°C -26.7°C), apply a dynamic force of 200 ft. lbs. to the following areas using a hemispherical weight with a 6" maximum radius:

- (i) The center of the two largest unsupported areas;
- (ii) The areas above at least two support blocks, if used;
- (iii) The areas above at least two intercell connectors, one cell, and one filler cap; and
- (iv) Areas on at least two corners. If the design consists of both inside and outside corners, test one of each.

(3) Record the condition of the covers, supports, intercell connectors, filler caps, cell covers, and filler material.

(b) *Acceptable performance.* Impact tests of any of the four covers shall not result in any of the following:

- (1) Bent intercell connectors.
- (2) Cracked or broken filler caps, except plastic tabs which extend from the body of the filler caps.
- (3) Cracks in the cell cover, cells, or filler material.
- (4) Cracked or bent supports.

(5) Cracked or splintered battery covers.

[53 FR 23500, June 22, 1988, as amended at 60 FR 33723, June 29, 1995]

§ 7.47 Deflection temperature test.

(a) *Test procedures.* (1) Prepare two samples for testing that measure 5 inches by $\frac{1}{2}$ inch, by the thickness of the material as it will be used. Prior to testing, condition the samples at $73.4 \pm 3.6^{\circ}\text{F}$ ($23 \pm 2^{\circ}\text{C}$) and $50 \pm 5\%$ relative humidity for at least 40 hours.

(2) Place a sample on supports which are 4 inches apart and immersed in a heat transfer medium at a test temperature range of 65°F -80°F (18.3°C -26.7°C). The heat transfer medium must be a liquid which will not chemically affect the sample. The testing apparatus must be constructed so that expansion of any components during heating of the medium does not result in deflection of the sample.

(3) Place a temperature measuring device with an accuracy of 1% into the heat transfer medium within $\frac{1}{8}$ inch of, but not touching, the sample.

(4) Apply a total load, in pounds, numerically equivalent to 11 times the thickness of the sample, in inches, to the sample midway between the supports using a $\frac{1}{8}$ inch radius, rounded contact. The total load includes that weight used to apply the load and any force exerted by the deflection measurement device.

(5) Use a deflection measuring device with an accuracy of ± 0.001 inches to measure the deflection of the sample at the point of loading as the temperature of the medium is increased at a uniform rate of $3.6 \pm 0.36^{\circ}\text{F}/\text{min.}$ ($2 \pm 0.2^{\circ}\text{C}/\text{min.}$). Apply the load to the sample for 5 minutes prior to heating, to allow compensation for creep in the sample due to the loading.

(6) Record the deflection of the sample due to heating at 180°F (82°C).

(7) Repeat steps 2 through 6 for the other sample.

(b) *Acceptable performance.* Neither sample shall have a deflection greater than .010 inch at 180°F (82°C).

[53 FR 23500, June 22, 1988; 53 FR 25569, July 7, 1988; 60 FR 33723, June 29, 1995]